

CLAIMS

1. A method comprising

tracking an amount of time that air has been delivered from an air handler to a space, and

5 based on the tracked amount of time, controlling at least one turn-on time or one turn-off time of the delivery of air from the air handler to the space.
2. The method of claim 1 in which tracking the amount of time that air has been delivered comprises tracking the on time of a circulating fan that
10 delivers the air.
3. The method of claim 1 in which the controlling of the turn-on time or turn-off time is also based on an intended amount of time that air has been delivered from an air handler to a space.
4. The method of claim 3 in which the intended amount of time
15 comprises a minimum amount of time.
5. The method of claim 3 in which the intended amount of time is specified by a user.
6. The method of claim 1 also including controlling a vent that delivers replacement air to the air handler.
- 20 7. The method of claim 1 in which the vent is controlled to open or close by a selectable amount.

8. The method of claim 7 also including controlling the vent to achieve a particular flow rate of replacement air.
9. The method of claim 8 in which the particular flow rate is derived from at least one user specified value.
- 5 10. The method of claim 9 in which the user specified value comprises an intended average flow rate.
11. A medium bearing instructions to cause a machine to
- track an amount of time that air has been delivered from an air handler to a space, and
- 10 based on the tracked amount of time, control at least one turn-on time or one turn-off time of the delivery of air from the air handler to the space.
12. Apparatus comprising
- a controller to
- track an amount of time that air has been delivered from an air handler
- 15 to a space, and
- based on the tracked amount of time, control at least one turn-on time or one turn-off time of the delivery of air from the air handler to the space.
13. A method comprising
- based on information about an intended flow rate of replacement air to
- 20 an air handler and an intended amount of time that air is to be delivered from the air handler to the space, performing a calculation to determine a flow rate

of replacement air to an air handler to be achieved during periods when a vent that controls the delivery of replacement air is open.

14. The method of claim 13 in which the information about an intended flow rate of replacement air comprises a value indicating an average volume
5 of air per time period.

15. The method of claim 13 in which the value is specified by a user.

16. The method of claim 13 in which the information about an intended amount of time is specified by a user.

17. The method of claim 13 in which the calculation includes dividing the
10 intended flow rate by the amount of time.

18. The method of claim 13 in which the calculation is also based on information about a duration of a duty cycle of a fan that delivers the replacement air to the space.

19. A medium bearing instructions to cause a machine to, based on
15 information about an intended flow rate of replacement air to an air handler and an intended amount of time that air is to be delivered from the air handler to the space, perform a calculation to determine a flow rate of replacement air to an air handler to be achieved during periods when a vent that controls the delivery of replacement air is open.

20 20. Apparatus comprising

a controller to, based on information about an intended flow rate of replacement air to an air handler and an intended amount of time that air is to be delivered from the air handler to the space, perform a calculation to

determine a flow rate of replacement air to an air handler to be achieved during periods when a vent that controls the delivery of replacement air is open.

21. A method comprising

5 enabling a user of a controller associated with an air handler to enter a value of an amount of replacement air to be delivered to a space.

22. The method of claim 21 in which the amount of the replacement air is expressed as an average volume per time.

23. A medium bearing instructions to cause a machine to enable a user of
10 a controller associated with an air handler to enter a value of an amount of replacement air to be delivered to a space.

24. Apparatus comprising

a controller to enable a user of a controller associated with an air
handler to enter a value of an amount of replacement air to be delivered to a
15 space.

25. A method comprising

enabling a user of a controller associated with an air handler to enter a value of a minimum amount of time that a fan of the air handler is to run.

26. The method of claim 25 also comprising enabling the user to enter a
20 value of a duty cycle of the fan.

27. A medium bearing instructions to cause a machine to enable a user of a controller associated with an air handler to enter a value of a minimum amount of time that a fan of the air handler is to run.

28. Apparatus comprising

5 a controller to enable a user of a controller associated with an air handler to enter a value of a minimum amount of time that a fan of the air handler is to run.

29. A method comprising

10 enabling a user of a controller associated with an air handler to enter a value of an amount of replacement air to be delivered to a space, a value of a minimum amount of time that a fan of the air handler is to run, and a value of a duty cycle of the fan.

30. A method comprising

15 enabling a user of a controller associated with an air handler to enter an indication of a temporary change in an amount of replacement air to be delivered from an air handler to a space.

31. The method of claim 30 also including enabling the user to enter an indication of the duration of the temporary change.

20 32. The method of claim 30 in which the temporary change comprises an increase associated with an increase in anticipated occupancy of the space.

33. The method of claim 30 in which the temporary change comprises a decrease associated with a decrease in anticipated occupancy of the space.

34. A medium bearing instructions to cause a machine to enable a user of a controller associated with an air handler to enter an indication of a temporary change in an amount of replacement air to be delivered from an air handler to a space.
- 5 35. Apparatus comprising
- a controller to enable a user of a controller associated with an air handler to enter an indication of a temporary change in an amount of replacement air to be delivered from an air handler to a space.
36. A method comprising
- 10 sensing flow of replacement air through a vent to an air handler,
- opening and closing the vent to regulate delivery of replacement air to the air handler to achieve an intended rate of flow, and
- based on the sensed flow, determining a clogging state of the filter.
37. The method of claim 36 in which the clogging state comprises the
- 15 filter being clogged.
38. The method of claim 36 in which the clogging state comprises the filter being new.
39. The method of claim 36 in which sensing flow of replacement air comprises sensing a change in the flow over time.
- 20 40. The method of claim 36 in which determining the clogging state includes comparing the sensed flow to a threshold value of flow.

41. The method of claim 40 in which the threshold value of flow is set empirically.
42. The method of claim 41 in which the threshold value of flow is set based on the history of the sensed flow.
- 5 43. The method of claim 36 in which sensing flow of replacement air is done by measuring a rate of rotation of a fan drive by the flow, or by measuring pressure of the air, or by measuring a velocity of the air.
44. The method of claim 36 in which the vent comprises a replacement air vent or a return air duct.
- 10 45. A medium bearing instructions to cause a machine to

sense flow of replacement air through a vent to an air handler,

open and close the vent to regulate delivery of replacement air to the air handler to achieve an intended rate of flow, and

based on the sensed flow, determine a clogging state of the filter.
- 15 46. Apparatus comprising

a controller to (a) sense flow of replacement air through a vent to an air handler, (b) open and close the vent to regulate delivery of replacement air to the air handler to achieve an intended rate of flow, and (c) based on the sensed flow, determine a clogging state of the filter.
- 20 47. A method comprising

issuing a vent signal to open a vent that regulates delivery of replacement air to an air handler, and

in connection with the issuing of the vent signal, issuing a fan signal to turn on a circulating fan of the air handler.

48. The method of claim 47 in which the fan signal turns on the fan independently of a thermostat that controls the air handler.

5 49. The method of claim 48 in which the fan is turned on using a relay.

50. A medium bearing instructions to cause a machine to

issue a vent signal to open a vent that regulates delivery of replacement air to an air handler, and

10 in connection with the issuing of the vent signal, issue a fan signal to turn on a circulating fan of the air handler.

51. Apparatus comprising

a controller to issue a vent signal to open a vent that regulates delivery of replacement air to an air handler, and

15 in connection with the issuing of the vent signal, issue a fan signal to turn on a circulating fan of the air handler.

52. Apparatus comprising

a conduit containing

a sensor to measure flow of air in the conduit,

an air flow regulator to control flow of the air in the conduit,

a coupling to couple the conduit to a fresh air intake of the air handler, and

a controller to control the air flow regulator based on the measured air flow.

5 53. The apparatus of claim 52 in which the sensor is in the conduit.

54. The apparatus of claim 52 in which the sensor is not in the conduit.

55. The apparatus of claim 52 in which the air flow regulator comprises a damper.

56. The apparatus of claim 52 in which the sensor comprises a fan.

10 57. The apparatus of claim 52 in which the conduit comprises a fresh air vent.

58. The apparatus of claim 52 in which the conduit comprises a return air duct.

59. Apparatus comprising

15 a controllable damper to regulate flow of air through an air flow passage between an exterior of a building and an air handler,

a sensor to sense air flow through the passage, and

terminals to connect the sensor and the controllable damper in a control circuit.

20 60. The apparatus of claim 59 in which the sensor comprises a contactless sensor.

61. The apparatus of claim 59 in which the sensor comprise magnetic elements.
62. The apparatus of claim 59 in which the sensor comprises a fan in the passage to rotate in response to air flowing through the passage.
- 5 63. The apparatus of claim 62 in which rotation of the fan is sensed as an indicator of the volume per unit time of air flowing through the passage.
64. The apparatus of claim 62 in which the fan comprises blades, at least one of the blades bears a magnet, and the sensor senses motion of the magnet.
65. The apparatus of claim 59 in which the damper is controllable to be
10 open or closed.
66. The apparatus of claim 65 in which the damper is also controllable to be open to a selected position among at least two different open positions.
67. The apparatus of claim 59 in which the damper is controllable to be open to a selected position with a range of positions.
- 15 68. The apparatus of claim 59 in which the damper comprises a rotating flap driven by an electric motor.
69. The apparatus of claim 62 in which the fan is free-wheeling.
70. The apparatus of claim 59 in which the control circuit controls opening and closing of the damper in response to sensed air flow through the passage.
- 20 71. The apparatus of claim 59 also including a filter to filter air flowing through the passage.

72. The apparatus of claim 59 also including a housing that defines at least a portion of the air flow passage and includes ends to mount the housing between an exterior of a building and an air handler.
73. The apparatus of claim 72 in which the housing also supports the
5 damper, the sensor, and the terminals.
74. The apparatus of claim 72 in which the housing also supports a filter.
75. The apparatus of claim 74 in which the filter is mounted on a second structure that mates with the housing.
76. The apparatus of claim 72 in which the housing also supports at least a
10 portion of the control circuit.
77. The apparatus of claim 59 in which the controller comprises a circuit that receives signals from the sensor and sends signals to the controllable damper.
78. The apparatus of claim 59 in which the control circuit includes a
15 terminal to connect to a thermostat.
79. The apparatus of claim 59 in which the control circuit includes an input to receive an indication from a user of how much air is to be permitted to flow through the passage.
80. The apparatus of claim 59 in which the control circuit comprises logic
20 to control the damper to allow a predetermined volume per unit time to flow in the passage.
81. An apparatus comprising

a controllable damper to regulate flow of air through an air flow passage between an exterior of a building and an air handler,

a sensor to sense air flow through the passage,

5 a control circuit to receive signals from the sensor and to send signals to cause the controllable damper to allow a predetermined volume per unit time to flow in the passage, and

a housing that supports the damper and the sensor and includes features to mount the housing between an exterior of a building and an air handler.